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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,895	10/04/2005	James A. Proctor Jr.	080591	3451

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QUALCOMM INCORPORATED
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EXAMINER	
MILORD, MARCEAU	
ART UNIT	**PAPER NUMBER**
2618	

NOTIFICATION DATE	DELIVERY MODE
08/13/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/551,895	PROCTOR JR. ET AL.	
	Examiner	Art Unit	
	Marceau Milord	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 October 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,10-20 and 25-36* is/are rejected.

7)☒ Claim(s) *6-9,21-24 and 37-41* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *04 October 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1-2, 10-17, 25-33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nicholls et al (US Patent No 7058368 B2) in view of Gebara et al (US Patent No 7123676 B2).

Regarding claim 1, Nicholls et al discloses a method for canceling a leakage signal (fig. 1, figs. 4-5) coupled from a transmitter to a receive signal path associated with a receiver, the transmitter and the receiver contained in a single wireless device operating using at least two frequency channels (col. 3, lines 1-27; col. 4, lines 33-62; col. 11, lines 3-23), the receiver operating on a first one of the at least two frequency channels and the transmitter operating on a second one of the at least two frequency channels, the method comprising: sampling a signal for transmission on the second of the at least two frequency channels (col. 8, lines 39-67; col. 11, line 32-col. 12, line 64).

However, Nicholls et al does not specifically disclose the steps of adjusting one or more parameters associated with the sampled signal to form an adjusted signal; and combining the adjusted signal with the receive signal path including the leakage signal, to form a combined signal so as to cancel the leakage signal.

On the other hand, Gebara et al, from the same field of endeavor, discloses the features of adjusting (controller) one or more parameters (variable gain amplifier, phase adjuster, emulation filter, delay adjuster) associated with the sampled signal to form an adjusted signal; and combining the adjusted signal with the receive signal path including the leakage signal (canceller device), to form a combined signal so as to cancel the leakage signal (col. 4, lines 4-61; col. 16, lines 9-67; col. 17, lines 2-62; col. 18, line 57-col. 19, line 41; col. 21, line 59-col. 22, line 62).

Gebara et al shows in figure 8, a wireless communication system that comprises a cancellation device, a phase adjuster, a variable gain amplifier, two splitters, a power detector, and a controller. The canceller samples the communication signal on the transmitting antenna. The phase adjuster adjusts the phase of the cancellation signal. The variable gain amplifier receives the phase shifted or matched cancellation signal from the phase shifter and matches the signal's amplitude to the interference signal (col. 4, lines 5-61; col. 8, lines 38-59; col. 10, lines 8-67). The splitter samples the transmitted signal on the feed line of the transmitting antenna. The controller adjusts the phase adjuster, the channel emulation filter, and the variable gain amplifier based on a feedback provided by the power detector. Furthermore, the controller also adjusts the respective parameters or operating points of the phase adjuster, the emulation filter, the delay adjuster, and the variable gain amplifier. In addition, the controllable delay adjuster matches the group delay of the interference signal propagating through the path of the feed line

to the group delay of the cancellation signal that propagates through the path of the signal processing circuit. The splitter samples the cancelled signal and feeds it to the power detector (col. 16, lines 9-58; col. 17, lines 60-64; col. 18, line 52-col. 19, line 41; col. 21, line 59-col. 22, line 64). It is clearly stated above that Gebara et al disclose the steps of adjusting one or more parameters associated with the sampled signal to form an adjusted signal; and combining the adjusted signal with the receive signal path including the leakage signal, to form a combined signal so as to cancel the leakage signal (fig. 2, fig. 8). It is considered that this technique could be applied in WLAN repeaters. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Gebara et al to the communication system of Nicholls in order to provide a wireless communication system that includes a cancellation device for generating a cancellation signal by sampling the communication signal on the transmitting antenna and processing that sample signal.

Regarding claim 2, Nicholls et al as modified discloses a method for canceling a leakage signal (fig. 1, figs. 4-5) coupled from a transmitter to a receive signal path associated with a receiver, wherein the single wireless device includes a frequency translating repeater (col. 3, lines 3-27; col. 11, lines 2-38).

Regarding claim 10, Nicholls et al as modified discloses a method for canceling a leakage signal (fig. 1, figs. 4-5) coupled from a transmitter to a receive signal path associated with a receiver, wherein the sampling includes sampling the signal for transmission after amplification of the signal (col. 8, lines 39-67).

Regarding claim 11, Nicholls et al as modified discloses a method for canceling a leakage signal (fig. 1, figs. 4-5) coupled from a transmitter to a receive signal path associated with a

receiver, wherein the sampling includes sampling the signal for transmission prior to transmission of the signal over an antenna (col. 10, line 64-col. 11, line 38).

Regarding claim 12, Nicholls et al as modified discloses a method for canceling a leakage signal (fig. 1, figs. 4-5) coupled from a transmitter to a receive signal path associated with a receiver, wherein the sampling includes sampling the signal for transmission prior to passing the signal through a circulator (col. 9, line 61-col. 10, line 20; col. 11, line 32-col. 12, line 41).

Regarding claim 13, Nicholls et al as modified discloses a method for canceling a leakage signal (fig. 1, figs. 4-5) coupled from a transmitter to a receive signal path associated with a receiver, wherein the combining includes combining the adjusted signal using an antenna (col. 11, lines 3-61; col. 12, lines 1-47).

Regarding claim 14, Nicholls et al as modified discloses a method for canceling a leakage signal (fig. 1, figs. 4-5) coupled from a transmitter to a receive signal path associated with a receiver, wherein the combining includes combining the adjusted signal using a circulator (col. 13, lines 16-41; col. 11, line 32-col. 12, line 47).

Regarding claim 15, Nicholls et al as modified discloses a method for canceling a leakage signal (fig. 1, figs. 4-5) coupled from a transmitter to a receive signal path associated with a receiver, wherein the one or more parameters includes one or more of a phase shift parameter and a amplitude parameter (col. 11, lines 3-38;col. 12, lines 25-64).

Regarding claim 16, Nicholls et al discloses an apparatus (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, the transmitter and the receiver contained in a single wireless device operating using at least two frequency channels (col. 3, lines 1-27; col. 4, lines 33-62; col. 11, lines 3-23), the

receiver operating on a first one of the at least two frequency channels and the transmitter operating on a second one of the at least two frequency channels, the apparatus comprising: a radio frequency interface; a processor; and a memory coupled to the processor and the radio frequency interface, the memory containing instructions for causing the processor to: sample a signal for transmission on the second of the at least two frequency channels (col. 8, lines 39-67; col. 11, line 32-col. 12, line 64).

On the other hand, Gebara et al, from the same field of endeavor, discloses the features of adjusting (controller) one or more parameters (variable gain amplifier, phase adjuster, emulation filter, delay adjuster) associated with the sampled signal to form an adjusted signal; and combining the adjusted signal with the receive signal path including the leakage signal (canceller device), to form a combined signal so as to cancel the leakage signal (col. 4, lines 4-61; col. 16, lines 9-67; col. 17, lines 2-62; col. 18, line 57-col. 19, line 41; col. 21, line 59-col. 22, line 62).

Gebara et al shows in figure 8, a wireless communication system that comprises a cancellation device, a phase adjuster, a variable gain amplifier, two splitters, a power detector, and a controller. The canceller samples the communication signal on the transmitting antenna. The phase adjuster adjusts the phase of the cancellation signal. The variable gain amplifier receives the phase shifted or matched cancellation signal from the phase shifter and matches the signal's amplitude to the interference signal (col. 4, lines 5-61; col. 8, lines 38-59; col. 10, lines 8-67). The splitter samples the transmitted signal on the feed line of the transmitting antenna. The controller adjusts the phase adjuster, the channel emulation filter, and the variable gain amplifier based on a feedback provided by the power detector. Furthermore, the controller also adjusts the respective parameters or operating points of the phase adjuster, the emulation filter,

the delay adjuster, and the variable gain amplifier. In addition, the controllable delay adjuster matches the group delay of the interference signal propagating through the path of the feed line to the group delay of the cancellation signal that propagates through the path of the signal processing circuit. The splitter samples the cancelled signal and feeds it to the power detector (col. 16, lines 9-58; col. 17, lines 60-64; col. 18, line 52-col. 19, line 41; col. 21, line 59-col. 22, line 64). It is clearly stated above that Gebara et al disclose the steps of adjusting one or more parameters associated with the sampled signal to form an adjusted signal; and combining the adjusted signal with the receive signal path including the leakage signal, to form a combined signal so as to cancel the leakage signal (fig. 2, fig. 8). It is considered that this technique could be applied in WLAN repeaters. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Gebara et al to the communication system of Nicholls in order to provide a wireless communication system that includes a cancellation device for generating a cancellation signal by sampling the communication signal on the transmitting antenna and processing that sample signal.

Regarding claim 17, Nicholls et al as modified discloses an apparatus (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, wherein the single wireless device includes a frequency translating repeater (col. 11, line 32-col. 12, line 47).

Regarding claim 25, Nicholls et al as modified discloses an apparatus (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, wherein the instructions in causing the processor to sample further

cause the processor sample the signal for transmission after amplification of the signal (col. 8, lines 39-67).

Regarding claim 26, Nicholls et al as modified discloses an apparatus (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, wherein the instructions in causing the processor to sample further cause the processor sample the signal for transmission prior to transmission of the signal over an antenna (col. 11, lines 3-61; col. 12, lines 1-47).

Regarding claim 27, Nicholls et al as modified discloses an apparatus (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, wherein the instructions in causing the processor to sample further cause the processor sample the signal for transmission prior to passing the signal through a circulator (col. 9, line 61-col. 10, line 20; col. 11, line 32-col. 12, line 41).

Regarding claim 28, Nicholls et al as modified discloses an apparatus (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, wherein the instructions in causing the processor to combine further cause the processor combine the adjusted signal using an antenna (col. 13, lines 16-41; col. 11, line 32-col. 12, line 47).

Regarding claim 29, Nicholls et al as modified discloses an apparatus (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, wherein the instructions in causing the processor to combine further cause the processor combine the adjusted signal using a circulator (col. 13, lines 16-41; col. 11, line 32-col. 12, line 47).

Regarding claim 30, Nicholls et al as modified discloses an apparatus (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, wherein the one or more parameters includes one or more of a phase shift parameter and a amplitude parameter (col. 13, lines 16-41; col. 11, line 32-col. 12, line 47).

Regarding claim 31, Nicholls et al as modified discloses an apparatus (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, wherein instructions cause the processor to continuously minimize the determined metric only when the transmitter is actively transmitting the signal (col. 11, lines 3-38; col. 12, lines 25-64).

Regarding claim 32, Nicholls et al discloses a canceller (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, the transmitter and the receiver contained in a single wireless device operating using at least two frequency channels (col. 3, lines 1-27; col. 4, lines 33-62; col. 11, lines 3-23), the receiver operating on a first one of the at least two frequency channels and the transmitter operating on a second one of the at least two frequency channels, the canceller comprising: a first coupler coupled to the transmit signal path, the first coupler configured to generate a reference signal (col. 8, lines 39-67; col. 11, line 32-col. 12, line 64); a second coupler coupled to the receive signal path, (col. 8, lines 39-67), the second coupler configured to couple an adjusted signal to the receive signal path (col. 8, lines 39-67; col. 11, line 32-col. 12, line 64; col. 13, lines 1-41).

On the other hand, Gebara et al, from the same field of endeavor, discloses the features of a third coupler (splitters 210, 230) coupled to the receive signal path, the third coupler

configured to generate a sampled signal; a parameter adjuster (controller) configured to adjust at least a first and a second parameter (variable gain amplifier, phase adjuster, emulation filter, delay adjuster) associated with the adjusted signal; and a detector (power detector) configured to detect a level associated with the leakage signal (col. 4, lines 4-61; col. 16, lines 9-67; col. 17, lines 2-62; col. 18, line 57-col. 19, line 41; col. 21, line 59-col. 22, line 62).

Gebara et al shows in figure 8, a wireless communication system that comprises a cancellation device, a phase adjuster, a variable gain amplifier, two splitters, a power detector, and a controller. The canceller samples the communication signal on the transmitting antenna. The phase adjuster adjusts the phase of the cancellation signal. The variable gain amplifier receives the phase shifted or matched cancellation signal from the phase shifter and matches the signal's amplitude to the interference signal (col. 4, lines 5-61; col. 8, lines 38-59; col. 10, lines 8-67). The splitter samples the transmitted signal on the feed line of the transmitting antenna. The controller adjusts the phase adjuster, the channel emulation filter, and the variable gain amplifier based on a feedback provided by the power detector. Furthermore, the controller also adjusts the respective parameters or operating points of the phase adjuster, the emulation filter, the delay adjuster, and the variable gain amplifier. In addition, the controllable delay adjuster matches the group delay of the interference signal propagating through the path of the feed line to the group delay of the cancellation signal that propagates through the path of the signal processing circuit. The splitters and the summation junction can each comprise a coupler (third coupler). The splitter samples the cancelled signal and feeds it to the power detector (col. 16, lines 9-58; col. 17, lines 60-64; col. 18, line 52-col. 19, line 41; col. 21, line 59-col. 22, line 64). It is clearly stated above that Gebara et al disclose the steps of adjusting one or more parameters

associated with the sampled signal to form an adjusted signal; and combining the adjusted signal with the receive signal path including the leakage signal, to form a combined signal so as to cancel the leakage signal (fig. 2, fig. 8). It is considered that this technique could be applied in WLAN repeaters. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Gebara et al to the communication system of Nicholls in order to provide a wireless communication system that includes a cancellation device for generating a cancellation signal by sampling the communication signal on the transmitting antenna and processing that sample signal.

Regarding claim 33, Nicholls et al as modified discloses a canceller (fig. 1, figs. 4-5) configured to cancel a leakage signal coupled from a transmitter to a receive signal path associated with a receiver, wherein the single wireless device includes a frequency translating repeater (col. 11, line 32-col. 12, line 47).

3. Claims 3-5, 18-20, 34-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nicholls et al (US Patent No 7058368 B2) in view of Gebara et al (US Patent No 7123676 B2) as applied to claims 1, 16, 32 above, and further in view of Bolin et al (US Patent No 71904275 B2).

Regarding claims 3-5, 18-20, 34-36, Nicholls and Gebara discloses everything claimed as explained except the features a wireless repeater operating the frequency translating repeater in one of a wireless area network and a wireless metropolitan area network; further comprising operating the wireless terminal according to one or more of an IS-95 protocol, a IS-2000 protocol, a W-CDMA, and a derivative protocol.

However, Bolin et al shows in figures 8 and 9, a communications system that uses a repeater in wireless local area network. The control signal transmitter is integrated in the repeater in a leaking cable system (repeaters). The control signal comprising virtual base station identification data is transmitted only from the part of the leaking cable system situated after the repeater. The signal selector for WCDMA works as an interference canceller that must know which codes to let pass and which to cancel (col. 2, lines 44-65; col. 5, lines 8-19; col. 10, lines 8-24; col. 10, lines 41-66; col. 12, lines 25-55). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the technique of Bolin to the modified system of Gebara and Nicholls in order to provide a wireless communication system using distributed antenna systems as well as leaking cable systems that are fed by repeater.

Allowable Subject Matter

4. Claims 6-9, 21-24, 37-41 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Ahn et al (US Patent No 65676448 B1) discloses a transmitter/receiver combination system and a transmission signal canceling method for use on a wireless communication system. In addition, the first coupler branches a portion of a transmission/reception signal input to the receiver. The second coupler phase delays the second transmission signal TX by 180 degrees.

The canceller also includes a third coupler for branching a portion of the noise signal and the transmission signal.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marceau Milord whose telephone number is 571-272-7853. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on 571-272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Marceau Milord

Primary Examiner

Art Unit 2618

/Marceau Milord/

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